nucleii is easily differentiated from the cells, but the body of the nucleus is very deeply stained. All the cells are poor in processes. The anterior lateral group is scant throughout. The changes in the cells are more marked in the lower portion of the dorsal cord than in the higher. Here the cells are in part pale and colorless, poor in chromatic substance and devoid of processes. Pieces of the cord hardened in the chrome salts and stained with aniline dyes show in the cervical cord a sinking in of the anterior horns with numerous little holes which are apparent to the naked eye, representing the post-mortem dropping out of necrotic atrophic tissues. The ground work of the anterior horns is rarefied, the ganglionic cells are lessened in number and amorphous, poor in processes and diffusedly stained. The central, the medial and the anterior are more involved than the posterior lateral, although the defect would seem to be more in the posterior portion of the anterior horns. The right anterior horn is smaller and more pointed than the left. Below this some blood cells are found lying free in the tissues. The blood-vessels walls are not much changed.

The extra medullary anterior and posterior roots in the cervical region are extremely degenerated.

Throughout the entire cord in the gray matter were found in places dilatation of the blood-vessels and small hæmorrhages. No degeneration of the white matter except a very slight evidence of involvement of the columns of Goll and the part of the pyramidal column bordering on the gray matter. Pia mater, especially in cervical region, thickened at posterior part of cord.

Same condition of small hæmorrhages in the motor nuclei of the eye muscles in the vicinity of the aqueduct of Sylvius and a similar but very much slighter condition in the motor nuclei of the medulla. The sensory nuclei of the medulla were almost without exception not at all encroached upon. The right facial nucleus at its inferior end was less well developed than the left. At this level the bottom of the fourth ventricle is filled with innumerable blood-vessels, little holes and small clumps of blood. Higher up are seen small hæmorrhages laterally in the side of the floor of the fourth ventricle and the aqueduct. Ventrally to the posterior long bundle and mesially to the substantia ferruginea at this height was a large hæmorrhage. J. C.

Further Contributions to the Study of Spinal Disease Occurring in the Course of Pernicious Anæmia.—Nonne (*Deutsche Zeitschrift für Nervenheilkunde*, Bd. vi., p. 313).

The author, who had already contributed a valuable study of the changes found in the spinal cord in two cases of pernicious anæmia to the literature of the subject records in the present paper the results of the very thorough microscopic examinations of seventeen new cases of pernicious anæmia. A brief clinical history, a careful report of the physical condition prior to death, and a detailed account of the gross and microscopic changes found in the various organs, especially in the spinal cord, are given in each of the seventeen cases. The spinal cord in each case was scrutinized very thoroughly in order to detect the very slightest changes and to study the morbid processes in their very incipiency. From an anatomical point of view Nonne distinguishes three groups amongst his seventeen cases. In the seven cases in the first group no changes whatever or changes so slight as hardly to justify their being termed morbid were found; in some of these cases minute changes, such as swelling of a number of axis cylinders and their sheaths were noted in the region of the middle root zones. The author is inclined to regard these changes as the very first signs of disturbed nutrition in the affected area, although no positive statement to that effect can be made as yet.

The second group consists of three cases showing beyond a doubt the characteristic spinal lesions in the early stages: a few small and even minute foci of acute degeneration were found in the white substance of the cord, always in the immediate vicinity of a blood-vessel.

In the seven cases forming the third group the spinal disease was present in more or less advanced stages. In the cervical cord the foci of degeneration were most numerous, they involved the posterior and middle root zones most commonly, and were arranged more or less symmetrically on the two sides of the cord; the columns of Goll are degenerated throughout. Irregular foci of degeneration were also present in the lateral columns without being confined to any special system. In the centre of every focus of degeneration a small diseased blood-vessel could almost invariably be made out. The process in the dorsal cord resembled that in the cervical portion, but was less marked. The lumbar region showed but very slight, if any, changes. (Case 14, Fich.)

In discussing the morbid anatomical conditions found the author emphasizes the important bearing of the diseased blood-vessels to the foci of degeneration. The morbid process in the blood-vessels effect primarily the peri-vascular lymph-spaces, which are often clogged with peculiar hyaline masses; subsequently the adventitia and media are involved in the morbid process and become thickened, whereas the intima seems to be affected last of all.

The study of the early stages of the spinal disease demonstrates the important fact, that it begins in distinct foci of degeneration occurring at some distance from each other; in the course of the disease these foci spread and at the same time new foci develop, which may unite with the older ones, so that the cord is finally involved quite extensively. The disease begins invariably in the cervical cord, and in its later stages the latter is without exception affected more extensively and intensely than the lower portions of the cord.

A marked predilection is shown by the disease for the middle root zones, other parts of the posterior column are, however, also often involved and even lateral and anterior columns may contain foci of degeneration at an early date. Numerous foci in the lateral and posterior columns may by uniting with each other or by causing secondary degeneration simulate the conditions of a combined systemic sclerosis.

A very important point recognized already by Lichtheim and Minnich and confirmed by the author, is the fact that the disease attacks the white substance of the cord exclusively, the posterior roots and the gray columns are never involved.

The author compares at length the changes found in the cord in this class of cases with those found in ergot of rye poisoning (Tuczek), in pellagra, disseminated sclerosis (Popoff's recent studies), paralysis agitans (Redlich), syphilitic myelitis, hereditary chorea, and chronic alcoholism, showing both the points in common in the more minute histological changes found in these various diseases and the distinctive features of each disease, especially as compared with the lesions occasioned by the disease under discussion.

In three cases in which peripheral nerves were examined, no changes were found in any of them. Certain clinical symptoms occurring in the course of pernicious anæmia point to disturbance in the nutrition of the brain; the study of the spinal lesions induced by the disease being practically completed by the author's investigations, it is to be expected that investigators will turn their attention now to a study of the lesions in the brain.

In comparing the nervous phenomena observed during life in his cases with the changes found in the cord the author remarks that in its early stages the spinal disease rarely gives rise to any distinct symptoms and in its later stages the latter are not nearly so pronounced as in locomotor ataxy, in ergot of rye poisoning and in pellagra, even in the presence of extensive lesions. This is accounted for partly by the fact that the disease predominates in the cervical region, which gives rise to less marked symptoms than the lesions of tabes, etc , in the lumbar region. The clinical symptoms most frequently observed are, loss of the knee-jerks, pains, paræsthesia, ataxy, muscular weakness. A table of the seventeen cases investigated concludes this excellent paper, which well deserves being read in the original. STIEGLITZ.

Anatomical Contribution to the Study of Combined Systemic Diseases of the Cord.—Jakob (*Zeitschr. f. Nervenheilk*, Vol. 6, Part 1 and 2, 1894.

A report of the anatomical examination of a cord found accidentally amongst the specimens of the pathological laboratory in Erlangen. The clinical history of the case could not be obtained. The cord had been preserved for years in alcohol of 70%, after having been hardened in Müller's. The staining was done after Weigert-Pál, with neutral carmine, alum-carmine, and hæmatoxyein-eosin.

The examination showed: 1. Degeneration of the direct and crossed pyramidal tracts; the former up to the level of the upper lumbar region, the latter as far down as the conus. The intensity of the degeneration has been found to increase from above downwards. 2. Total degeneration of the cerebellar tracts in the whole length. 3. Incomplete degeneration of the columns of Goll. 4. Incomplete degeneration of the columns of Burdach. 5. The anterior and lateral roots are normal; the lateral and posterior root zones degenerated here and there. 6. Anterior horns normal, except a slight diminution of the fibres taking a transversal course. Clark's cells normal; anterior roots normal; posterior roots show some disease. The degeneration of the posterior columns does not reach so far down as the degeneration of the lateral columns All degenerated areas are symmetrically distributed on the cross section of the cord.

These findings lead the author to the following conclusions:

The symmetry of the diseased areas, their anatomical course and the absence of a primary focus in the whole extension of the cord, justify us in regarding combined systemic degenerations as a disease originating primarily in the nervous, and not in the accessory tissue of the central nervous system, *i. e.*, the disease starts in the nerve fibres proper and not in the vessels, neurolgia or meninges of the cord. The absence of a distinct myelitic focus militates against the theory of it being a focal or diffuse myelitis.

The symmetric distribution of the diseased areas is the expression of the elective regularity of the process, following the same path as the embryonic development of medullary sheaths to the fibres. Both ways the function of the fibres seems to have some importance; fibres of similar or allied function getting attacked by the disease and getting simultaneously medullated.

The histological nature of the process has been difficult to ascertain because of the fact that the cord was so long in alcohol. The signs of absolute inflammation found in the environments of the degenerated foci are secondary. The increased demand exercised on the resting fibres during the development of the disease might produce the dilatation of the vessels and the removal of the products of degeneration can be looked upon as a sort of mechanical or chemical stimulus. Noteworthy is the absence of disease in Clark's cells in spite of the total degeneration in the cerebellar tracts. FRAENKEL.

CLINICAL.

The Disturbances of Sensibility of the Globe of the Eye, and its Appendages in Locomotor Ataxia.—Berger (*La Méd. Mod.*, November 2, 1894). The disturbances of sensibility of the skin in locomotor ataxia are well known, but those of the visual sphere seem to have escaped the notice of the authors up to the present time. In the